PA[illegible]NT COOPERATION TREAT[illegible]

From the INTERNATIONAL BUREAU

PCT

NOTIFICATION OF ELECTION

(PCT Rule 61.2)

To:

Commissioner
US Department of Commerce
United States Patent and Trademark Office, PCT
2011 South Clark Place Room CP2/5C24
Arlington, VA 22202
ETATS-UNIS D'AMERIQUE

in its capacity as elected Office

Date of mailing (day/month/year) 27 July 2001 (27.07.01)	
International application No. PCT/GB00/04129	**Applicant's or agent's file reference** 57.0410WOPCT
International filing date (day/month/year) 26 October 2000 (26.10.00)	**Priority date** (day/month/year) 27 October 1999 (27.10.99)
Applicant COUET, Benoit et al	

1. The designated Office is hereby notified of its election made:

[X] in the demand filed with the International Preliminary Examining Authority on:

05 May 2001 (05.05.01)

[ ] in a notice effecting later election filed with the International Bureau on:

2. The election [X] was

[ ] was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

The International Bureau of WIPO
34, chemin des Colombettes
1211 Geneva 20, Switzerland

Facsimile No.: (41-22) 740.14.35

Authorized officer

Pascal Piriou

Telephone No.: (41-22) 338.83.38

PA ENT COOPERATION TREAT

PCT

From the INTERNATIONAL BUREAU

To:

WANG, William, L.
Schlumberger Cambridge Research Limited
Intellectual Property Law Dept.
High Cross
Madingley Road
Cambridge CB3 0EL
ROYAUME-UNI

NOTIFICATION OF THE RECORDING OF A CHANGE

(PCT Rule 92bis.1 and Administrative Instructions, Section 422)

Date of mailing (day/month/year)
17 July 2001 (17.07.01)

Applicant's or agent's file reference
57.0410WOPCT

IMPORTANT NOTIFICATION

International application No.
PCT/GB00/04129

International filing date (day/month/year)
26 October 2000 (26.10.00)

1. The following indications appeared on record concerning:

[X] the applicant [ ] the inventor [ ] the agent [ ] the common representative

Name and Address
SERVICES PETROLIERS SCHLUMBERGER
42, rue Saint Dominique
F-75007 Paris
France

State of Nationality: FR
State of Residence: FR
Telephone No.:
Facsimile No.:
Teleprinter No.:

2. The International Bureau hereby notifies the applicant that the following change has been recorded concerning:

[X] the person [ ] the name [ ] the address [ ] the nationality [ ] the residence

Name and Address
SERVICES PETROLIERS SCHLUMBERGER
42, rue Saint Dominique
F-75007 Paris
France

State of Nationality: FR
State of Residence: FR
Telephone No.:
Facsimile No.:
Teleprinter No.:

3. Further observations, if necessary:
Applicant for only france

4. A copy of this notification has been sent to:

[X] the receiving Office
[ ] the International Searching Authority
[X] the International Preliminary Examining Authority
[X] the designated Offices concerned
[ ] the elected Offices concerned
[ ] other:

The International Bureau of WIPO
34, chemin des Colombettes
1211 Geneva 20, Switzerland

Facsimile No.: (41-22) 740.14.35

Authorized officer
HA Ki-Nam

Telephone No.: (41-22) 338.83.38

Form PCT/IB/306 (March 1994)

004155337

TENT COOPERATION TRE[illegible]Y

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference	FOR FURTHER ACTION	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
57.0410 WO PCT		
International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/GB00/04129	26/10/2000	27/10/1999
International Patent Classification (IPC) or national classification and IPC G01N29/02		
Applicant SCHLUMBERGER HOLDINGS LIMITED et al		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 7 sheets, including this cover sheet.

   ☐ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

   These annexes consist of a total of sheets.

3. This report contains indications relating to the following items:

   - I ☒ Basis of the report
   - II ☐ Priority
   - III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
   - IV ☒ Lack of unity of invention
   - V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations suporting such statement
   - VI ☐ Certain documents cited
   - VII ☐ Certain defects in the international application
   - VIII ☐ Certain observations on the international application

Date of submission of the demand	Date of completion of this report
05/05/2001	05.12.2001
Name and mailing address of the international preliminary examining authority: European Patent Office - P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk - Pays Bas Tel. +31 70 340 - 2040 Tx: 31 651 epo nl Fax: +31 70 340 - 3016	Authorized officer Hocquet, A Telephone No. +31 70 340 2928

Form PCT/IPEA/409 (cover sheet) (January 1994)

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/GB00/04129

I. Basis of the report

1. With regard to the **elements** of the international application *(Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17))*:
Description, pages:

1-32 as originally filed

Claims, No.:

1-26 as originally filed

Drawings, sheets:

1/11-11/11 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
- ☐ the claims, Nos.:

☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

   (Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

IV. Lack of unity of invention

1. In response to the invitation to restrict or pay additional fees the applicant has:

   ☐ restricted the claims.

   ☐ paid additional fees.

   ☐ paid additional fees under protest.

   ☐ neither restricted nor paid additional fees.

2. ☐ This Authority found that the requirement of unity of invention is not complied and chose, according to Rule 68.1, not to invite the applicant to restrict or pay additional fees.

3. This Authority considers that the requirement of unity of invention in accordance with Rules 13.1, 13.2 and 13.3 is

   ☐ complied with.

   ☒ not complied with for the following reasons:
   see separate sheet

4. Consequently, the following parts of the international application were the subject of international preliminary examination in establishing this report:

   ☒ all parts.

   ☐ the parts relating to claims Nos. .

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	4,6-8,10,11,14,15,17,18,23,24
	No:	Claims	1-3,5,9,12,13,16,19-22,25,26
Inventive step (IS)	Yes:	Claims	11,14,15
	No:	Claims	1-10,12-13,16-26

Industrial applicability (IA) Yes: Claims 1-26
No: Claims

2. Citations and explanations
see separate sheet

R Item I

Basis of the opinion

Reference is made to the following documents:

D1: US-A-5 661 233 (SPATES) 26 August 1997 cited in the application

D2: US-A-3 341 835 (WERNER) 12 September 1967

D3: US-A-5 159 838 (LYNNWORTH) 3 November 1992

Re Item IV

Lack of unity of invention

The subject-matter common to claims 1 and 16 can be summarised as ' a deposit monitoring apparatus located above ground level comprising: a deposit monitor adapted to measure deposition of material on a monitoring surface that is directly exposed to fluids prone to causing deposition of material; a power supply adapted to supply said monitor with electrical energy'. All these technical features are known from the state of the art (see for example D1 or D2, passages cited in the International Search Report (ISR)).

The remaining technical features of claim 1 (measuring a change in resonance frequency of an acoustic device in a frequency range of 10 khz to 250 khz) and of claim 16 (having a deposit removal system in a control loop with the monitor) are neither identical nor corresponding in the sense of Rule 13.2 PCT.

Therefore, the sets of claims 1-15 and 16-25 do not fulfill the requirements of unity of invention of Rule 13 PCT.

Re Item V

Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1 The subject-matter of claims 1-3, 5, 9, 12, 13, 16, 19, 20, 21, 22, 25, 26 does not satisfy the criterion of novelty set forth in Article 33(2) PCT for the following reasons: D2 discloses a deposit monitoring apparatus located above ground level (on an airplane) comprising: an acoustic device adapted to operate in a resonance mode in a frequency range of 10 kHz to 250 kHz, the device including a monitoring surface directly exposed to fluids prone to causing deposition of material (water in atmosphere causing deposition of ice), wherein the deposition of the material on the monitoring surface is monitored by measuring a change in

resonance frequency of the acoustic device; and a power supply adapted to supply said monitor with electrical energy. The device of D2 uses the change of frequency of a magnetostrictive or piezo-electric transducer whose vibrations are focussed on a tube vibrating longitudinally at 20-40 Khz for sensing the solidification of ice on a monitoring surface of the tube. D2 mentions the use of the heat produced by the acoustic device for deposit removal (D2, col. 8, lines 8-17) in control loop with the monitor. D2 mentions also the use of a separate heater as deposition removal system (see column 3, lines 50-52 or column 6, lines 1-12) placed near the tube (the tube constituting an acoustic sensor having a surface exposed to the fluids) .

2 The subject-matter of claims 4, 6, 7, 8, 10, 17, 18, 23, 24 does not satisfy the criterion set forth in Article 33(3) PCT for the following reasons:

2.1 The choice of an acoustic horn as the focussing element, and the choice of frequencies around 100 Khz for driving the acoustic device are known from D3 for similar acoustic sensors (see passages in the ISR), and the skilled person would regard it a normal design procedure to combine all the features set out in claims 4 and 6. Thus, the subject-matter of claims 4 and 6 does not involve an inventive step.

2.2 D1 discloses a deposit monitoring apparatus located on subsea or surface pipelines or tanks (col. 14, lines 4-26) comprising: an acoustic device adapted to operate in a resonance mode including a monitoring surface directly exposed to fluids prone to causing deposition of material, wherein the deposition of material on the monitoring surface is monitored by measuring a change in resonance frequency of the acoustic device (column 7, lines 54-57); and a power supply adapted to supply said monitor with electrical energy (idem). The apparatus further comprises a deposit removal system adapted to at least partially remove the deposition from the monitoring surface, the deposit removal system being in a control loop with said deposit monitor (col. 14, lines 10-14), wherein the deposit removal system includes a deposition inhibiting or removing chemical agent (idem). The deposit removal system may be a heater near a sensor (the surface monitoring the deposition) having a surface exposed to the fluids (col 13, lines 55-65). D1 and D2 belong thus to the same technical field: the monitoring of deposits using acoustic wave devices. D1 indicates that the acoustic wave device can be any type of piezoelectric acoustic device known in the art as being able to

sense any solidification of constituent (D1, col. 4, lines 41-43). It is known from D2 to use the change of frequency of a piezo-electric driven tube vibrating longitudinally at 20-40 Khz for sensing the solidification of ice on a monitoring surface. The skilled person would therefore regard it as a normal option to include these features in the device described in document D1. Thus, the subject-matter of claims 7, 10, 17, 23 does not involve an inventive step.

2.3 D1 mentions pipes and well head as possible locations for its sensor apparatus, and discloses an attachment to a conduit by a flanged opening to the desired location (D1, column 13, lines 12-19 and figure 5). It would be obvious to a skilled person to use it on or near any of the devices enumerated in claims 8 or 18, because they all have surfaces on which the monitoring of deposits is obviously desirable. Thus, the subject-matter of claims 8 and 18 does not involve an inventive step.

2.4 D1 mentions the use of mechanical scraping for deposit removal (D1, col. 14, line 5), and it would thus be obvious for the skilled person that the deposit removal system can include elements adapted to exert a physical force onto the deposited material. Thus, the subject-matter of claim 24 does not involve an inventive step.

3 Although D1 mentions the use of mechanical scraping for deposit removal (D1, col. 14, line 5), and D2 mentions the use of the heat produced by the acoustic device for deposit removal (D2, col. 8, lines 8-17), none of the documents of the ISR discloses a deposit removal system which uses the acoustic device to exert a physical force onto the deposited material. The combination of the features of dependent claim 11 and of claim 14 dependent of claim 11, is thus neither known from, nor rendered obvious by, the available prior art.

4 The combination of the features of dependent claim 15 is neither known from, nor rendered obvious by, the available prior art, which does not disclose or suggest to include an additional sensing system to analyze the material deposited.

PATENT COOPERATION TREATY

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INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference	**FOR FURTHER ACTION**	see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.
57.0410WOPCT		
International application No.	International filing date *(day/month/year)*	(Earliest) Priority Date *(day/month/year)*
PCT/GB 00/04129	26/10/2000	27/10/1999
Applicant		
SCHLUMBERGER HOLDINGS LIMITED		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 3 sheets.

[X] It is also accompanied by a copy of each prior art document cited in this report.

1. **Basis of the report**

   a. With regard to the **language,** the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

   [ ] the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

   b. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international search was carried out on the basis of the sequence listing :

   [ ] contained in the international application in written form.

   [ ] filed together with the international application in computer readable form.

   [ ] furnished subsequently to this Authority in written form.

   [ ] furnished subsequently to this Authority in computer readble form.

   [ ] the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

   [ ] the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2. [ ] **Certain claims were found unsearchable** (See Box I).

3. [X] **Unity of invention is lacking** (see Box II).

4. With regard to the **title,**

   [X] the text is approved as submitted by the applicant.

   [ ] the text has been established by this Authority to read as follows:

5. With regard to the **abstract,**

   [X] the text is approved as submitted by the applicant.

   [ ] the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the **drawings** to be published with the abstract is Figure No. 1a

   [ ] as suggested by the applicant.

   [X] because the applicant failed to suggest a figure.

   [ ] because this figure better characterizes the invention.

   [ ] None of the figures.

INTERNATIONAL SEARCH REPORT

International Application No
GB 00/04129

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 G01N29/02 G01G3/16 B08B7/02 E21B37/00 G01N5/00
G01N33/28

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 G01N G01G B08B E21B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 3 341 835 A (WERNER) 12 September 1967 (1967-09-12) column 4, line 67 -column 5, line 2; figures column 7, line 7 - line 13 column 7, line 48 - line 73	1-3,5,9, 16,19-22
A	column 8, line 6 - line 19	11,24
X	US 5 646 338 A (DECLERCQ GHISLAIN ET AL) 8 July 1997 (1997-07-08) column 1, line 19 - line 54	16,19,23
A	column 5, line 50 - line 60 column 6, line 17 - line 39 column 8, line 30 - line 51	15
A	column 9, line 12 - line 43	10
	-/--	

[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

° Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
9 February 2001	21/02/2001

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Hocquet, A

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Form PCT/ISA/210 (second sheet) (July 1992)

INTERNATIONAL SEARCH REPORT

International Application No
[redacted]GB 00/04129

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 4 553 137 A (MARXER JOHN E ET AL) 12 November 1985 (1985-11-12) column 2, line 8 - line 12 column 3, line 55 - line 68	1
X	US 5 661 233 A (SPATES JAMES J ET AL) 26 August 1997 (1997-08-26) column 2, line 30 - line 38 column 4, line 10 - line 25 column 8, line 20 - line 62 column 13, line 20 - line 28 column 13, line 55 - line 65 column 14, line 4 - line 38	16-19,23
A	US 3 926 271 A (PATASHNICK HARVEY) 16 December 1975 (1975-12-16) column 2, line 34 - line 56 column 4, line 26 - line 48 column 8, line 55 - line 64	3-5, 20-22
A	US 5 595 243 A (MAKI JR VOLDI E ET AL) 21 January 1997 (1997-01-21) column 4, line 38 - line 41 column 5, line 5 - line 16; figures 3-5	1,16
A	US 5 159 838 A (LYNNWORTH LAWRENCE C) 3 November 1992 (1992-11-03) column 1, line 10 - line 19 column 12, line 20 - line 34 column 1, line 63 -column 2, line 4 column 10, line 20 - line 45; table I	1,3-5, 20-22
X	US 5 969 235 A (ALLAN GRAEME) 19 October 1999 (1999-10-19) column 3, line 42 -column 4, line 3; figures	16
X	EMMONS ET AL.: "on-site, near real time monitoring of scale deposition" PROCEEDINGS OF SPE 1999 CONFERENCE ' PRODUCTION OPERATIONS AND ENGINEERING', vol. 2, 3 - 6 October 1999, pages 389-394, XP000979810 Houston (USA) cited in the application page 392, column 1, paragraph 4 -column 2, paragraph 3 page 390, column 2, paragraph 1 - paragraph 2	16-19
A	US 5 889 209 A (PIEDRAHITA RAUL H ET AL) 30 March 1999 (1999-03-30) cited in the application the whole document	12,13, 25,26

1

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No
GB 00/04129

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 3341835 A	12-09-1967	NONE	
US 5646338 A	08-07-1997	GB 2291520 A	24-01-1996
		AU 2897495 A	04-03-1996
		CA 2195330 A	15-02-1996
		EP 0774108 A	21-05-1997
		FI 970413 A	31-01-1997
		GB 2292226 A	14-02-1996
		WO 9604529 A	15-02-1996
		NO 970403 A	01-04-1997
		ZA 9506311 A	14-03-1996
		AU 690715 B	30-04-1998
		BR 9508485 A	30-12-1997
		DE 69504856 D	22-10-1998
		DE 69504856 T	18-03-1999
		NZ 289206 A	26-01-1998
US 4553137 A	12-11-1985	NONE	
US 5661233 A	26-08-1997	US 5827952 A	27-10-1998
US 3926271 A	16-12-1975	DE 2553638 A	05-08-1976
US 5595243 A	21-01-1997	NONE	
US 5159838 A	03-11-1992	NONE	
US 5969235 A	19-10-1999	AU 3795099 A	03-02-2000
US 5889209 A	30-03-1999	NONE	